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IS 9036 (1978): Polishes for transparent plastics in sheet form, liquid [CHD 23: Lac, Lac Products and Polishes]



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“Knowledge is such a treasure which cannot be stolen”

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Indian Standard

**SPECIFICATION FOR
POLISH FOR TRANSPARENT PLASTICS
IN SHEET FORM, LIQUID**

UDC 667.82-404 : 667.636.46 : 678.744.32-415



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INDIAN STANDARDS INSTITUTION
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR, MARG
NEW DELHI 110002

Indian Standard

SPECIFICATION FOR POLISH FOR TRANSPARENT PLASTICS IN SHEET FORM, LIQUID

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(*Continued on page 2*)

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Indian Standard
SPECIFICATION FOR
POLISH FOR TRANSPARENT PLASTICS
IN SHEET FORM, LIQUID

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 13 December 1978, after the draft finalized by the Polishes Sectional Committee had been approved by the Chemical Division Council.

0.2 Polish for transparent plastics in sheet form, liquid, is intended primarily for cleaning and polishing transparent plastics surfaces in sheet form. The polish is intended to remove dirt and soil, and produce a smooth lustrous finish.

0.3 The material shall not contain any ingredient which would constitute under conditions of normal use any hazard to the health of the person using it, nor should it have any adverse action on the surface on which it is applied.

0.4 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS:2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard prescribes the requirements and methods of sampling and test for polish for plastics, liquid, suitable for general application on transparent plastics surfaces in sheet form where optical precision is required.

2. TERMINOLOGY

2.1 For the purpose of this standard, the definitions given in IS:8171-1976† shall apply.

*Rules for rounding off numerical values (*revised*).

†Glossary of terms relating to polishes and related materials.

3. REQUIREMENTS

3.1 Composition — The polish shall consist essentially of finely powdered abrasive in a liquid phase. The abrasive material shall be of such particle size that all of it shall pass through a 53-micron IS Sieve.

3.2 Stability and Consistency — The polish shall readily mix to a uniform consistency on shaking in its container. It shall be free flowing. It shall maintain its general characteristics and shall not break down into its constituents between 10°C and 50°C when tested in accordance with the method prescribed in A-1.

3.3 Polishing Properties — The polish shall be suitable for use with a polishing cloth. It shall spread easily and evenly. The polish shall dry sufficiently in about 10 minutes to permit easy removal after being applied and shall continue to be removable for at least 24 hours. The polish with not more than two applications shall efficiently remove from plastics surfaces all residue, masking glue, lubricating oil and soil. The cleaned surface shall be free from any trace of oil film, residue, discolouring or scratch marks.

3.4 Polishing Efficiency — The efficiency of the polish in removing abrasion shall be such that when determined by the method prescribed in A-2 the decrease in light scattering shall be not less than 80 percent.

3.5 Effect on New Surface — The polish when used for cleaning new surfaces, shall not produce any scratch marks. This shall be tested by the method prescribed in A-3, when the increase in light scattering shall not exceed 0.2 percent.

3.6 Freedom from Agents Causing Crazing — The polish shall be free from agents causing crazing when tested by the method prescribed in A-4.

3.7 Oil and Water Removing Properties — The oil and water removing properties of the polish shall be such that the specimens shall show no visible signs of residual oil and water when tested by the method prescribed in A-5.

3.8 Keeping Properties — The polish furnished under this specification shall conform to the requirements thereof and there shall be no deterioration in the characteristics for one year from the date of actual delivery when stored in its original sealed container under shade.

4. PACKING AND MARKING

4.1 Packing — The polish shall be packed in glass, metal or any other suitable plastics containers. No product shall be so packed that it will act on the container or be acted upon by it. The container shall be fitted with either metal or plastics continuous thread screw cap which can be

easily closed or opened. All screw caps shall have a non-absorbent lining material which shall remain in the cap when the cap is removed from the container.

4.1.1 The containers shall be packed in cartons and in turn in suitable cardboard, fibreboard or wooden boxes or as agreed to between the purchaser and the supplier.

4.2 Marking — The containers shall be marked with the following:

- a) Manufacturer's name and trade-mark, if any;
- b) Net content of the material, when packed;
- c) Name of the material;
- d) Directions for use; and
- e) Month and year of manufacture.

4.2.1 The containers may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

5. TEST METHODS

5.1 Test shall be carried out as prescribed in **A-1** to **A-5**.

5.2 Quality of Reagents — Unless specified otherwise, pure chemicals and distilled water (*see* IS : 1070-1977*) shall be used in tests.

NOTE — 'Pure chemicals' shall mean chemicals that do not contain impurities which affect the results of analysis.

6. SAMPLING

6.1 The method of drawing and preparation of representative samples and criteria for conformity shall be as given in Appendix B.

*Specification for water for general laboratory use (*second revision*).

APPENDIX A

(*Clause 3.2, 3.4 to 3.7*)

METHOD OF TEST FOR POLISH FOR TRANSPARENT PLASTICS IN SHEET FORM, LIQUID

A-1. TEST FOR STABILITY AND CONSISTENCY

A-1.1 Procedure — Test two sealed containers as follows:

- a) Maintain one container at 50°C for 48 hours.
- b) Maintain one container at 10°C for 8 hours.

After this treatment allow both the containers to return to room temperature and then examine visually before and after shaking for any change in consistency or characteristics.

A-2. DETERMINATION OF POLISHING EFFICIENCY

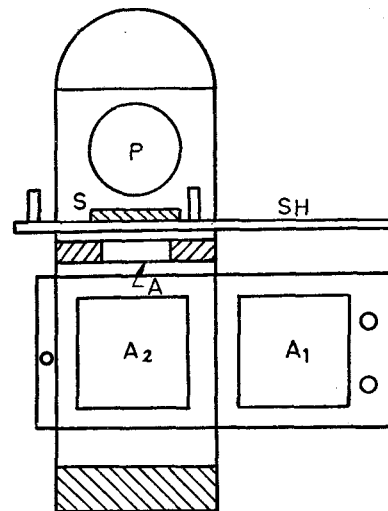
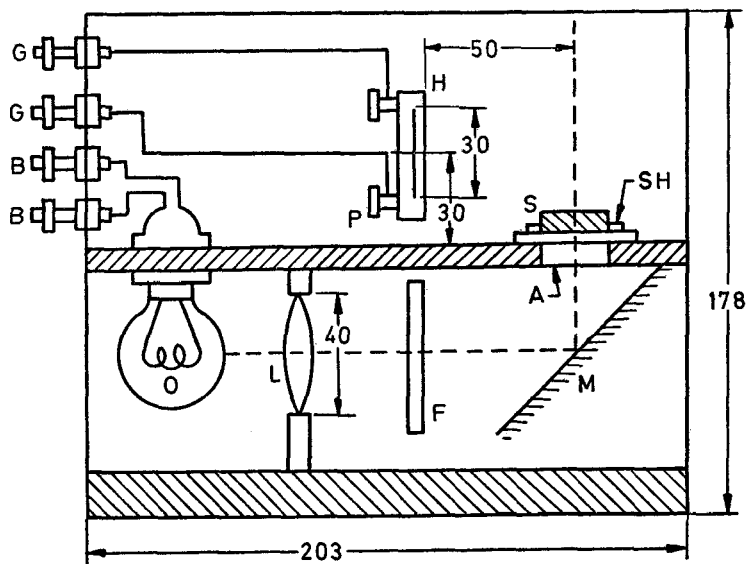
A-2.1 Apparatus

A-2.1.1 Galvanometer — a sensitive galvanometer.

A-2.1.2 Photometer — comprising the following features:

- a) An approximately parallel beam of light of constant intensity which could pass at right angles through a circular aperture of 20 mm diameter, provision being made for the specimens to be conveniently placed over the aperture, the surface to be measured being uppermost.
- b) The light scattering by the specimens could be measured by a selenium photo-cell having a circular sensitive element of 30 mm diameter.
- c) The photo-cell could be fixed in a plane at a distance of 50 mm from the centre and at right angles to the plane of the aperture, the centre of the photo-cell being 30 mm above the plane of the aperture.
- d) The photo-cell could be suitably protected against stray light and connected to sensitive galvanometer.
- e) Provision be made to decrease the beam intensity by a known factor when measuring the light scattering of the abraded specimens before and after polishing. A convenient method is to incorporate a neutral density filter, placed in the path of the beam and having a density of about 1.0.

A-2.1.2.1 A suitable instrument is shown in Fig. 1. It is adjusted to give almost maximum deflection when the standard abraded specimen is at *A* and the neutral density filter is in the light beam. Thereafter the conditions are maintained constant throughout.



A = 20 mm Circular aperture

A_1 = Clear aperture

A_2 = Neutral density filter

B = Battery supply terminals

F = Neutral density filter slide

G = Galvanometer terminals

H = Hood to prevent reflected light reaching P from top inside surface

L = Bi-convex lens (focal length 50 mm)

M = Mirror

O = Light source (12 V 24 W car headlamp type)

P = Barrier layer photo-cell

S = Methyl methacrylate

SH = Specimen holder

All dimensions in millimetres.

FIG. 1 INSTRUMENT FOR MEASURING LIGHT SCATTERING

A-2.2 Preparation of Test Specimen — Prepare ten specimens, 25 mm square in shape and 4.7 mm in thickness by cutting from new polymethyl methacrylate sheet. Get one face rounded with a file and abraded by hand rubbing on a mixture of 0.2 g of 150 to 170 micron IS Sieve carborundum powder mixed with 0.5 ml of water for a period of 3 min with moderate pressure on a fresh piece of plate glass. Wash the abraded specimen in running cold tap water and rinse in distilled water. Dry the specimen in air at room temperature. In the preparation of each abraded specimen use fresh carborundum powder and water. Care should be taken to avoid finger marking the abraded surface or damaging the opposite original surface of the specimens.

A-2.3 Procedure — Before polishing, determine the light scattering of the standard specimens as specified in A-2.3.1 and A-2.3.2.

A-2.3.1 For each specimen measure the difference in galvanometer deflections with and without the abraded specimen at A , and obtain the mean value dA ; observe that this value does not differ from the value obtained with standard abraded specimens by more than ± 5 percent. Then polish the ten abraded specimens according to the following procedure. A suitable polishing machine is shown in Fig. 2.

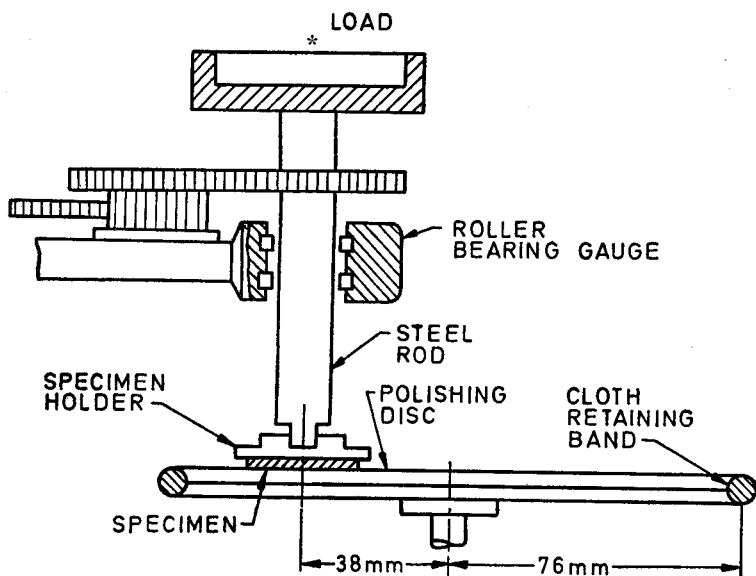


FIG. 2 POLISHING MACHINE

A-2.3.2 Tightly stretch over the disc polishing cloth of suitable size and hold securely in position by any suitable means. Then apply polish to the cloth at the rate of 5 ml per 100 cm² of cloth and work evenly into the cloth with finger tips. Rotate the disc at 50 ± 5 rpm. Hold the specimen being polished with its abraded surface in contact with the cloth under a load of 1 kg and rotate in opposition to the polishing disc at 36 ± 5 rpm. Make the specimen holder so that the specimen adjusts itself to the cloth in order to obtain an even polishing of the flat surface of the specimen. A suitable holder is shown in Fig. 3. The polishing time shall be 3 minutes, the axis of rotation of the specimen being 38 mm from the centre of the disc. Use fresh polish and new cloth for each specimen. After polishing, wipe the specimens carefully to remove surplus polish and then mechanically wipe for a period of 1 minute and allow to stand for 1 hour after which the light scattering shall again be determined. For each specimen, measure the difference in galvanometer deflections with and without the polished specimen at *A* and determine the mean value.

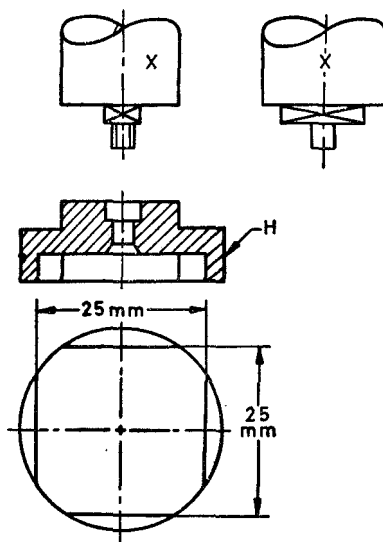


FIG. 3 SPECIMEN HOLDER

A-2.4 Calculation — Calculate the decrease in percentage light scattering as follows:

$$\text{Decrease in percentage light-scattering} = 100 (1 - d/dA)$$

where

d = mean value of the difference in galvanometer deflection with and without the polished specimen, and

dA = mean value of the difference in galvanometer deflections with and without the abraded specimen.

A-3. DETERMINATION OF EFFECT OF POLISH ON NEW SURFACE

A-3.1 Apparatus

A-3.1.1 Galvanometer — sensitive galvanometer.

A-3.1.2 Photometer — same as described in A-2.1.2 (with rounded corners uppermost).

A-3.2 Preparation of Test Specimens — Cut ten 25 mm square and 4.7 mm thick new polymethyl methacrylate sheets, the corners rounded on one face with a file and remove the protecting layers of paper. Immerse the specimens for 30 min in 0.1 percent solution of Lissapol LS paste in water at approximately 50°C, rinse in cold distilled water, and allow to dry in air at room temperature and then lightly wipe with a clean, dry polishing cloth. Take care so as to avoid scratching or finger marking the surface of the specimens. Then measure the light scattering of the specimens using the photometer described in A-2.3.

A-3.3 Procedure — Remove the neutral density filter from the path of the light beam, measure the galvanometer deflections D_1 and D_0 with and without the specimen at A and obtain the mean value for percentage light scattering $\frac{100}{F.dA} (D_1 - 0.915 D_0)$.

A-3.3.1 Obtain the filter factor F in the above expression by placing a specimen at A , abraded in such a manner that without the filter in the light beam, approximately full scale deflection is obtained on the galvanometer. Then interpose the filter in the light beam and note the deflection. The factor be taken as the ratio between the two deflections thus obtained. Polish and clean the ten specimens in exactly the same way as described in A-2.3.2. Obtain the mean value for percentage light scattering of the polished specimens $\frac{100}{F.dA} (D_2 - 0.915 D_0)$ and the change due to polishing calculated by difference.

A-3.4 Calculation — Calculate the change in percentage light scattering as follows:

$$\begin{aligned} \text{Change in percent} \\ \text{light scattering} &= \frac{100}{F.dA} (D_2 - 0.915 D_0) - \frac{100}{F.dA} (D_1 - 0.915 D_0) \end{aligned}$$

where

D_0 , D_1 and D_2 = galvanometer deflections; without the specimen, with the specimen and with the polished specimen respectively;

F = filter factor; and

dA = mean value of the galvanometer deflections with and without the abraded specimen.

A-4. TEST FOR FREEDOM FROM AGENTS CAUSING CRAZING

A-4.1 Procedure — Cut a specimen of new polymethyl methacrylate sheet of size $15 \times 25 \times 2$ mm. Remove the protective paper and get the specimen freed from any residual gelatin adhesive by soaking in distilled water at room temperature for approximately 30 minutes. Rinse the specimen in distilled water, allow to dry in air at room temperature and lightly wipe with a clean dry polishing cloth.

A-4.1.1 Clamp the specimen lightly at each end so that it is bent flatwise round a suitable mandrel of radius 90 cm. Then apply polish to about 90 mm length of the outer surface of the specimen at its centre. Store the assembly for 72 hours in an atmosphere free from organic solvent vapours at $20 \pm 3^\circ\text{C}$.

At the end of this period rinse the polish from the specimen and then wash in lukewarm soapy water. Rinse with distilled water and allow to dry at room temperature. Examine the specimen for crazing.

A-5. TEST FOR OIL AND WATER REMOVING PROPERTIES

A-5.1 Procedure — Cut two panels of new polymethyl methacrylate sheet about 90 mm square. Remove the protective paper and clean the specimens as prescribed in **A-4.1**. Smear one panel with a film of oil and wet the other with water. Then rub the surface with separate cloths, containing the polish, for about 2 minutes and finally rub with a clean cloth for a similar period. Examine the panels visually for the presence of oil and water.

APPENDIX B

(Clause 6.1)

SCALE OF SAMPLING AND CRITERIA FOR CONFORMITY

B-1. GENERAL REQUIREMENTS FOR SAMPLING

B-1.0 In drawing, preparing, storing and handling test samples the following precautions and directions shall be observed.

B-1.1 Samples shall be taken in a protected place not exposed to damp air, dust or soot.

B-1.2 The sampling instrument shall be clean and dry when used.

B-1.3 Precautions shall be taken to protect the samples, the material being sampled, the sampling instrument and the containers for samples from adventitious contamination.

B-1.4 The samples shall be placed in clean, dry and air-tight glass or other suitable containers on which the material has no action.

B-1.5 The sample containers shall be of such a size that they are almost completely filled by the sample.

B-1.6 Each sample container shall be sealed air-tight after filling and marked with full details of sampling, the date of sampling and the month and year of manufacture of the material.

B-1.7 Samples shall be stored in such a manner that the temperature of the material does not vary unduly from ambient temperature.

B-2. SCALE OF SAMPLING

B-2.0 Samples to determine the conformity of a consignment of polish to this specification shall be selected so as to be representative of the consignment. Samples drawn in compliance with an agreement between the purchaser and the supplier to evaluate the various characteristics of the polish, shall be held to be representative of the consignment. In case of dispute, the following scheme is recommended to serve as a guide.

B-2.1 Lot — All the containers in a single consignment of the material drawn from the same batch of manufacture and belonging to the same size shall constitute a lot. If a consignment is declared or known to consist of different batches of manufacture or of different sizes of containers, the containers belonging to the same batch and size shall be grouped together and each such group shall constitute a separate lot.

B-2.1.1 Samples shall be tested for each lot for ascertaining the conformity of the material to the requirements of this specification.

B-2.2 The number (n) of containers to be chosen from the lot shall depend upon the size of the lot and shall be in accordance with col 1 and 2 of Table 1.

B-2.3 These containers shall be chosen at random from the lot. In order to ensure the randomness of selection, some random number table as agreed to between the purchaser and the supplier shall be used. In case such a table is not available, the following procedure shall be adopted:

Arrange all the containers in a lot in a systematic manner and starting from any container, count them as 1, 2, 3,....., up to r and so on, where r is the integral part of N/n . Every r th container thus counted shall be withdrawn to give sample for test.

TABLE 1 NUMBER OF CONTAINERS TO BE SELECTED FOR SAMPLING

(Clause B-2.2)

LOT SIZE (N)	No. OF CONTAINERS TO BE CHOSEN (n)
(1)	(2)
Up to 500	10
501 to 1 000	15
1 001 and above	20

B-3. PREPARATION OF COMPOSITE TEST SAMPLE

B-3.1 Shake well each of the containers selected according to **B-2.3** and pour out a quantity of liquid such that the total quantity obtained from all the containers provides material sufficient for all tests (about 500 g).

B-3.2 Thoroughly mix the material drawn from the selected containers so as to form the composite sample. Divide this composite sample into three parts, each sufficient for carrying out the intended tests and transfer them to thoroughly clean and dry sample containers. Send one of these each to the purchaser and the supplier. Reserve the third composite sample as the referee sample bearing the seal of the purchaser and the supplier. Keep the referee sample at a place agreed to between the purchaser and the supplier.

B-4. NUMBER OF TESTS AND CRITERIA FOR CONFORMITY

B-4.1 Except for **A-1**, tests for all characteristics shall be carried out on the composite sample.

B-4.2 The lot shall be declared as conforming to this specification if the test results satisfy the corresponding requirements.

INDIAN STANDARDS

ON

POLISHES

IS:

1746-1970	Shoe polish, paste (<i>first revision</i>)
4779-1968	Leather sole and edge wax polishes
5467-1969	Shellac wax
5468-1969	Blanco
5480-1969	Automobile polish, paste
5481-1969	Floor polish, liquid
5487-1969	Metal polish, liquid
5969-1970	Metal polish, paste
6045-1970	Wax-emulsion sole leather polish
6271-1971	Metal polishes (special)
6350-1971	Shoe cream
6704-1972	Pigmented floor polish, paste
6776-1972	Buffing compounds used for nickel and chrome plated surfaces
6771-1972	Aluminium polish, paste, for aircraft
7982-1976	Automobile polish, liquid
7983-1976	Cleaning solution, porcelain
7984-1976	Rubbing compounds, lacquer
8171-1976	Glossary of terms relating to polishes and related materials
8540-1977	Glass cleaner, liquid
8541-1977	Floor polish, paste
8542-1977	Polish for wooden furniture, paste